Trend Study 17-46-02

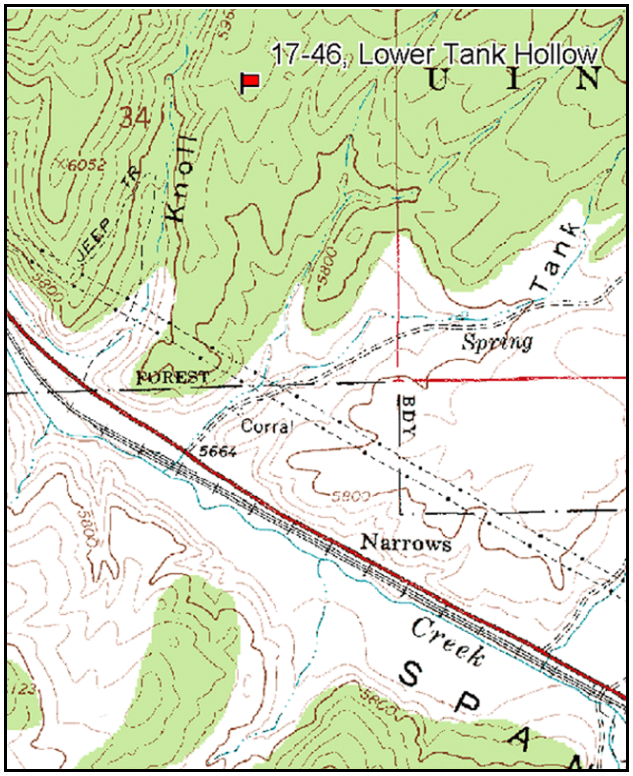
Study site name: Lower Tank Hollow. Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 175 degrees magnetic.

Frequency belt placement: line 1 (11 & 95 ft), line 2 (34 ft), line 3 (59 ft), line 4 (71 ft).

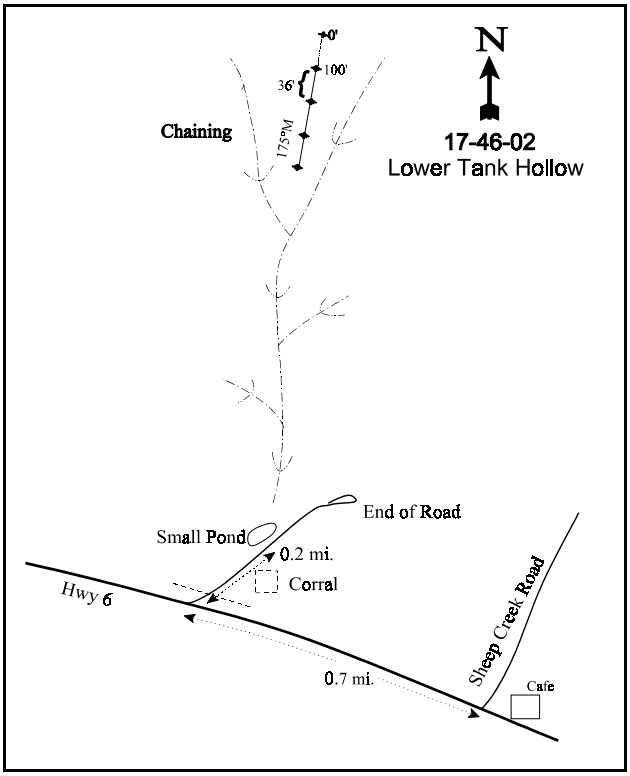
LOCATION DESCRIPTION

In Spanish Fork Canyon, turn north up Tank Hollow, which is 0.7 miles west of the Sheep Creek Road and cafe on Highway 6. Drive about 0.2 miles and stop by a small stock pond in the forks of the drainage. From here, walk north about 1/2 mile up the left fork, and keep left at two other major forks. Where the wash starts to flatten out at the head, there is a chained ridge to the right. The study site is on the ridge, about 20 paces from the center of the drainage. The 0-foot baseline stake is near the highest point on the ridge.



Map Name: Mill Fork

Township 9S, Range 5E, Section 34



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4426474 N 470080 E

DISCUSSION

Tank Hollow - Trend Study No. 17-46

This trend study samples the chaining in Lower Tank Hollow. The 600 acre chaining and seeding treatment was completed in 1971. The study is located on a small ridge representative of the long, sloping ridges in the treated area. The bottoms tend to be dominated by grass, while basin big sagebrush occurs further down into the bottoms. There is a variety of browse on the ridges. The slope is 10% with a southerly aspect and an elevation of 5,600 feet. This Forest Service land is in the Diamond Fork cattle allotment. When not rested, it appears to receive moderate use. Judging by deer pellet groups on the small ridge where the study is located, there is moderate to heavy deer use and light elk use. Tank Hollow is considered a critical area for wintering deer. A pellet group transect read on site in 2002 estimated 47 deer and 5 elk days use/acre (116 ddu/ha and 13 edu/ha). Most of the big game use appears to be during the winter. Livestock were in the area during the 2002 reading on June 17th. They had heavily utilized forage on the lower portions of the chaining but had only lightly used the area of the trend site. Pellet group data estimated 7 cow days use/acre (16 cdu/ha).

Soil textural analysis indicates a clay loam with a shale substrate. The effective rooting depth is about 13 inches with a neutral soil reaction (pH 7.2). Phosphorous is low (6.8 ppm) and could limit plant growth and development on the site. The soil is moderately deep in most places and is dark in color. There is evidence of substantial past erosion in the form of exposed roots and pedestalled plants, but there does not appear to be significant erosion since the site was established in 1989. There seems to be enough perennial grass cover to prevent all but localized soil movement. The erosion condition class was determined to be slight in 2002.

Pre-treatment vegetation was a predominantly mature stand of pinyon and juniper. Juniper appears to be renewing its dominance in the chaining, and although they are fairly large trees, density remains moderately low. Point quarter data from 2002 estimated 74 juniper trees/acre with an average diameter of nearly 6½ inches. Thirty-five percent of the juniper sampled were mature trees that had been tipped over during the chaining but were still alive. Total canopy cover of juniper was estimated at nearly 6% in 2002.

Preferred browse is somewhat limited on this site. Basin big sagebrush and bitterbrush are the only moderately abundant preferred species on site. Basin big sagebrush has a low density averaging 400 plants/acre in 1997 and 2002. It was reportedly heavily hedged in 1989 but showed only light use in 1997. Heavy use was reported on 68% of the population in 2002. Poor vigor and percent decadence follow this same trend as both parameters showed higher levels in 1989 and 2002 compared to 1997. Drought conditions prevailed during both the 1989 and 2002 readings, while conditions were wetter than normal in 1997. Bitterbrush provides some additional preferred forage with a small density of 260 plants/acre estimated in 2002. Use has been consistently heavy but vigor was normal until 2002. Due to drought conditions combined with heavy browsing, vigor was poor on 38% of the bitterbrush sampled in 2002. The number of decadent plants increased from 0% in 1997 to 69% of the population in 2002. In addition, over half of the bitterbrush were classified as dying due to abundant crown death. No young or seedling bitterbrush were sampled in 2002.

Other palatable browse include low densities of snowberry and serviceberry. The most abundant browse is stickyleaf rabbitbrush with an estimated density of 1,320 plants/acre in 1997. It increased to 2,020 by 2002.

The herbaceous understory is diverse and fairly abundant. Crested wheatgrass, which has significantly increased in nested frequency with every reading since 1989, dominates the herbaceous understory. It provided 64% of the grass cover or almost 50% of the total herbaceous cover in 1997. During the 2002 reading, crested wheatgrass accounted for 91% of the grass cover or 82% of the total herbaceous cover. Other seeded grasses include intermediate wheatgrass, smooth brome, and orchard grass. The grasses provide abundant forage and good erosion control. Pacific aster is the most common forb. Diversity is fair, but the forage value of most species is low.

1989 APPARENT TREND ASSESSMENT

The soil trend appears stable with adequate protective ground cover to prevent most erosion. The trend for the desirable and preferred browse species, mountain big sagebrush and bitterbrush, appears to be in a state of decline. Utilization is heavy, vigor is poor on many plants, and the number of decadent plants is high. The herbaceous understory appears stable but a better composition of perennial forbs is desired.

1997 TREND ASSESSMENT

Soil trend is upward with less bare ground exposed to erosion in 1997 then in 1989. The grasses still provide abundant forage and good erosion control. Photos show more ground cover and fewer bare areas as well. Browse trend is up slightly. Most of the changes in density of shrubs are due to the much larger sample size used in 1997 which gives better population estimates for clumped or discontinuous populations. However, average vigor for mountain big sagebrush and bitterbrush has improved and the number of decadent plants has declined significantly. Herbaceous understory trend is up with an increase in nested frequency for perennial grasses and forbs. Nested frequency of the most abundant grass, crested wheatgrass, has more than doubled. It now provides 64% of the total grass cover or 47% of the total herbaceous cover. Grass understory composition is good, but a better composition of forbs is desired.

TREND ASSESSMENT
soil - up (5)
browse - up slightly (4)
herbaceous understory - up (5)

2002 TREND ASSESSMENT

Trend for soil is down slightly. A return to drought conditions has caused an increase in bare soil. There is still adequate protective ground cover to prevent most soil movement. The erosion condition class was determined to be slight in 2002. Trend for the key browse species, mountain big sagebrush and bitterbrush, is down slightly. Use is heavier, vigor reduced, recruitment poor, and percent decadence up. Vigor and decadence numbers are similar to 1989 which was also a drought year. Trend for the herbaceous understory is mixed. Sum of nested frequency for perennial grasses has remained similar to 1997. However, the most abundant grass, crested wheatgrass, has increased significantly. It now provides 91% of the total grass cover or 82% of the total herbaceous cover. Sum of nested frequency for perennial forbs has declined dramatically. A similar trend was found on the nearby Tank Hollow site (17-42). Trend for the herbaceous understory is considered slightly down with a significant decline in several perennial grass and forb species. Another negative aspect of the herbaceous trend is an increasing dominance of crested wheatgrass.

TREND ASSESSMENT
soil - down slightly (2)
browse - down slightly (2)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 46

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron cristatum	$_{a}$71	$_{b}$164	$_{c}$224	28	54	73	12.57	14.51
G	Agropyron intermedium	31	19	23	11	7	9	.18	.19
G	Agropyron spicatum	$_{a}$7	$_{b}$36	$_{a}$4	3	14	1	2.79	.03
G	Bromus inermis	$_{b}$30	$_{a}$7	$_{a}$-	13	3	-	.21	-
G	Bromus tectorum (a)	-	$_{b}$29	$_{a}$6	-	14	2	.51	.01
G	Dactylis glomerata	-	1	3	-	1	1	.03	.01
G	Leucopoa kingii	$_{b}$11	$_{a}$-	$_{a}$-	6	-	-	-	-
G	Oryzopsis hymenoides	$_{b}$56	$_{a}$30	$_{a}$36	29	13	15	.68	.79
G	Poa fendleriana	$_{b}$36	$_{a}$1	$_{a}$1	14	1	1	.03	.00
G	Poa pratensis	$_{a}$-	$_{b}$59	$_{a}$15	-	19	4	1.44	.33
G	Poa secunda	$_{a}$-	$_{b}$20	$_{a}$3	-	8	1	.55	.03
G	Sitanion hystrix	-	-	1	-	-	1	-	.00
G	Stipa comata	4	-	-	2	-	-	-	-
G	Stipa lettermani	-	14	4	-	4	2	.72	.06
Total for Annual Grasses		0	29	6	0	14	2	0.50	0.00
Total for Perennial Grasses		246	351	314	106	124	108	19.22	15.98
Total for Grasses		246	380	320	106	138	110	19.73	15.99
F	Achillea millefolium	-	1	-	-	1	-	.00	-
F	Agoseris glauca	-	5	-	-	2	-	.01	-
F	Alyssum alyssoides (a)	-	$_{b}$63	$_{a}$2	-	22	2	1.16	.01
F	Allium spp.	-	10	2	-	3	1	.02	.00
F	Aster chilensis	$_{b}$100	$_{b}$93	$_{a}$22	42	36	10	1.16	.26
F	Astragalus convallarius	$_{ab}$13	$_{b}$25	$_{a}$3	7	11	2	.36	.03
F	Astragalus spp.	3	-	-	1	-	-	-	-
F	Astragalus utahensis	5	4	-	2	3	-	.06	-
F	Cardaria draba	-	-	12	-	-	4	-	.04
F	Castilleja linariaefolia	-	8	-	-	3	-	.04	-
F	Camelina microcarpa (a)	-	$_{b}$13	$_{a}$1	-	6	1	.03	.00
F	Carduus nutans (a)	$_{a}$-	$_{b}$22	$_{a}$-	-	13	-	.37	-
F	Calochortus nuttallii	-	2	-	-	2	-	.01	-
F	Chaenactis douglasii	$_{a}$2	$_{b}$19	$_{a}$-	2	7	-	.12	-
F	Cirsium spp.	$_{b}$39	$_{a}$22	$_{a}$4	23	11	3	.45	.06
F	Comandra pallida	$_{a}$-	$_{b}$32	$_{a}$-	-	12	-	.40	-
F	Crepis acuminata	-	1	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	4	-	-	4	-	.02	-
F	Epilobium brachycarpum (a)	-	1	-	-	1	-	.00	-
F	Eriogonum brevicaule	$_{b}$21	$_{a}$10	$_{a}$8	12	4	5	.33	.46

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
F	Erigeron pumilus	$_{b}$27	$_{a}$-	$_{a}$2	11	-	1	-	.00
F	Hackelia patens	4	4	-	2	3	-	.04	-
F	Hedysarum boreale	-	4	-	-	2	-	.18	-
F	Lappula occidentalis (a)	-	10	-	-	4	-	.19	-
F	Lithospermum ruderale	$_{a}$-	$_{b}$18	$_{b}$13	-	9	7	.46	.28
F	Lomatium spp.	-	3	-	-	3	-	.01	-
F	Machaeranthera canescens	$_{b}$9	$_{a}$-	$_{a}$-	5	-	-	-	-
F	Penstemon caespitosus	-	7	10	-	3	3	.33	.04
F	Phlox hoodii	15	16	19	10	7	10	.42	.42
F	Phlox longifolia	11	11	18	4	4	8	.02	.06
F	Ranunculus testiculatus (a)	-	4	-	-	2	-	.01	-
F	Salsola pestifer (a)	8	-	-	4	-	-	-	-
F	Sphaeralcea coccinea	-	3	5	-	1	2	.15	.01
F	Taraxacum officinale	-	2	1	-	1	1	.00	.00
F	Tragopogon dubius	$_{a}$2	$_{b}$17	$_{a}$4	1	9	2	.10	.03
F	Verbascum thapsus	-	5	-	-	2	-	.03	-
F	Vicia americana	$_{a}$-	$_{c}$35	$_{b}$11	-	14	5	.27	.05
F	Viola spp.	-	3	-	-	1	-	.15	-
Total for Annual Forbs		8	117	3	4	52	3	1.79	0.01
Total for Perennial Forbs		251	360	134	122	155	64	5.19	1.79
Total for Forbs		259	477	137	126	207	67	6.99	1.81

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 46

Type	Species	Strip Frequency '97	Strip Frequency '02	Average Cover % '97	Average Cover % '02
B	Amelanchier utahensis	4	3	.78	.53
B	Artemisia tridentata tridentata	17	18	1.04	1.73
B	Chrysothamnus depressus	13	3	.43	-
B	Chrysothamnus nauseosus albicaulis	3	1	.00	-
B	Chrysothamnus parryi	0	11	-	.40
B	Chrysothamnus viscidiflorus viscidiflorus	34	37	1.88	1.71
B	Gutierrezia sarothrae	10	19	.36	.07
B	Juniperus osteosperma	10	8	6.30	10.64
B	Opuntia spp.	3	8	.18	.01
B	Purshia tridentata	5	10	1.49	3.17
B	Rhus trilobata	0	1	-	-
B	Rosa woodsii	0	1	-	-
B	Symphoricarpos oreophilus	3	5	.15	.15
Total for Browse		102	125	12.64	18.44

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 46

Species	Percent Cover '97	Percent Cover '02
Amelanchier utahensis	-	1.25
Artemisia tridentata tridentata	-	1.33
Chrysothamnus depressus	-	.07
Chrysothamnus parryi	-	.42
Chrysothamnus viscidiflorus viscidiflorus	-	1.42
Gutierrezia sarothrae	-	.03
Juniperus osteosperma	6.4	5.83
Purshia tridentata	-	2.42
Symphoricarpos oreophilus	-	.17

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 46

Species	Average leader growth (in) '02
Artemisia tridentata tridentata	1.5
Purshia tridentata	1.6

Point-Quarter Tree Data
Herd unit 17, Study no: 46

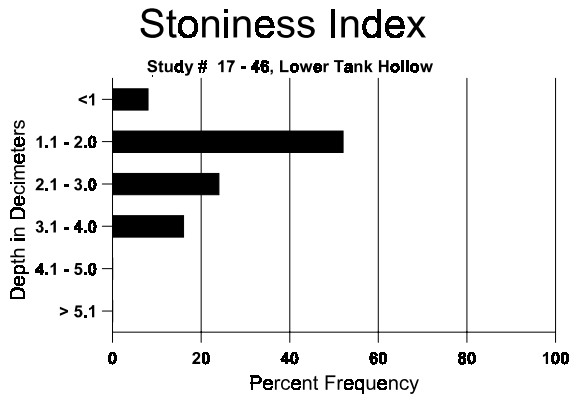
Species	Trees per Acre		Average diameter (in)	
	'97	'02	'97	'02
Juniperus osteosperma	57	74	5.8	6.4

BASIC COVER --
Herd unit 17 , Study no: 46

Cover Type	Nested Frequency		Average Cover %		
	'97	'02	'89	'97	'02
Vegetation	326	305	6.00	36.93	34.80
Rock	73	100	1.25	.73	1.97
Pavement	207	248	9.75	5.83	3.66
Litter	389	378	45.25	41.37	40.40
Cryptogams	57	51	0	1.41	2.48
Bare Ground	263	286	37.75	24.28	35.84

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 46, Lower Tank Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.2	45.8 (15.5)	7.2	40.7	21.4	37.8	3.2	6.8	275.2	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 46

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre ⁄02	Days Use per Acre (ha) ⁄02
Rabbit	3	8	-	-
Elk	11	14	70	5 (13)
Deer	30	36	609	47 (116)
Cattle	1	2	78	7 (16)

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 46

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	1	-	-	2	-	-	-	3	-	-	-	60	28	36	3
	02	-	-	-	-	-	2	-	-	-	2	-	-	-	40	32	38	2
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	1	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	60%	00%	-40%
'02	00%	100%	33%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		0%
'97	100			0%
'02	60			33%

Artemisia tridentata tridentata																		
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	89	-	-	1	-	-	-	-	-	-	1	-	-	-	33	26	22	1
	97	7	1	1	4	-	-	-	-	-	13	-	-	-	260	40	38	13
	02	-	3	7	-	-	-	-	-	-	9	-	1	-	200	32	32	10
D	89	-	-	1	-	-	-	-	-	-	-	-	1	-	33			1
	97	2	1	-	-	-	-	-	-	-	1	-	-	2	60			3
	02	-	-	6	1	-	-	-	-	-	4	-	1	2	140			7
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	67%	33%	+76%
'97	10%	05%	10%	-10%
'02	16%	68%	21%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	99	Dec:	33%
'97	420		14%
'02	380		37%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus depressus																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	38	-	-	1	-	-	-	-	-	39	-	-	-	780	6	14	39
	02	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	9	5
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	-86%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		0%
'97	860			0%
'02	120			17%

Chrysothamnus nauseosus albicaulis																		
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	1	-	-	1	-	-	-	-	-	1	1	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20	24	27	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	40	0
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+45%
'97	33%	00%	00%	-67%
'02	00%	00%	100%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	33	Dec:	0%
'97	60		0%
'02	20		100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus parryi																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	8	26	3	-	-	-	-	-	-	37	-	-	-	740	6	13	37
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	2	1	4	-	-	-	1	-	-	3	-	-	5	160			8
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	60%	16%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		0%
'97	0			0%
'02	900			18%

Chrysothamnus viscidiflorus viscidiflorus																		
Y	89	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	97	4	-	-	2	-	-	1	-	-	7	-	-	-	140			7
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	89	76	-	-	-	-	-	-	-	-	76	-	-	-	2533	11	12	76
	97	48	-	-	4	-	-	-	-	-	52	-	-	-	1040	14	14	52
	02	56	6	3	2	-	-	-	-	-	64	-	3	-	1340	8	12	67
D	89	8	-	-	-	-	-	-	-	-	3	-	-	5	266			8
	97	4	-	1	1	-	-	-	-	-	5	-	-	1	140			7
	02	19	10	2	-	-	-	-	-	-	16	-	2	13	620			31
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	05%	-56%
'97	00%	02%	02%	+35%
'02	16%	05%	18%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	3032	Dec:		9%
'97	1320			11%
'02	2020			31%

Eriogonum microthecum																		
M	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	4	8	1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	33	Dec:		-
'97	0			-
'02	0			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	18	-	-	-	-	-	-	-	-	18	-	-	-	360	11	11	18
	02	17	1	-	-	-	-	-	-	-	16	-	2	-	360	8	10	18
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	14	-	1	-	-	-	-	-	-	3	-	-	12	300			15
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	+29%
'02	03%	03%	41%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		0%
'97	480			4%
'02	680			44%

Juniperus osteosperma																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	1	-	-	-	-	-	4	-	-	-	80			4
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	4	-	1	2	-	-	-	-	-	7	-	-	-	140	74	101	7
	02	7	-	-	-	-	-	-	-	-	6	1	-	-	140	-	-	7
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	09%	00%	-27%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		-
'97	220			-
'02	160			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7	9	1
	97	4	-	-	1	-	-	-	-	-	5	-	-	-	100	3	15	5
	02	7	-	-	-	-	-	-	-	-	7	-	-	-	140	4	12	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+76%
'97	00%	00%	00%	+13%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	33	Dec:	-
	'97	140		-
	'02	160		-

Purshia tridentata																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	1	-	-	-	-	-	-	1	-	-	-	33	10	35	1
	97	-	-	-	-	1	4	-	-	-	5	-	-	-	100	16	55	5
	02	-	-	3	-	-	1	-	-	-	4	-	-	-	80	16	57	4
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	6	-	-	2	-	-	1	4	-	-	5	180			9
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	100%	00%	+73%
'97	17%	67%	00%	+54%
'02	00%	100%	38%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	33	Dec:	0%
	'97	120		0%
	'02	260		69%

Rhus trilobata																		
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	0%
	'97	0		0%
	'02	20		100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Rosa woodsii																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	20		-

Symphoricarpos oreophilus																		
M	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33	15	17	1
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	22	35	4
	02	3	-	-	1	-	-	-	-	-	4	-	-	-	80	16	22	4
D	89	-	-	1	-	-	-	-	-	-	-	-	1	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	50%	50%	50%	+18%
'97	00%	00%	00%	+20%
'02	20%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	66	Dec:	50%
	'97	80		0%
	'02	100		20%